

RECEIVED
CENTRAL FAX CENTER

JUL 08 2008

Application No. 09/715,935

REMARKS

Claims 18, 20-38 and 62-73 are pending. Claim 18 has been amended to introduce a feature from claim 27. No new matter is introduced. Applicant acknowledges with appreciation the allowance of claims 33-38 and 71-73 and the allowability of claims 29-32. Applicant respectfully requests reconsideration of the remaining rejections based on the above amendments and the following remarks.

Rejection Over Thaler in view of Whitney et al.

The Examiner rejected claims 18, 20, 22-28, 62, and 64 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 5,547,716 to Thaler (Thaler) in view of U.S. Patent 5,043,548 to Whitney et al. (Whitney) and further in view of Allen et al., J. Vac. Sci. Technol., 16(2), Mar/Apr 1979 (Allen). To simplify the present discussion, Applicant incorporates by reference arguments presented in responses of 6 February 2008 and 3 March 2008. With all due respect, Applicant respectfully maintains that Applicant's claimed invention is clearly distinct from the teachings of the combined disclosures of the cited references. Applicant here focuses on responding to the Examiner's response to Applicant's arguments. Also, claim 18 has been amended to more particularly point out Applicant's claimed invention. Furthermore, Whitney and Allen teach a particular configuration that is very distinct from the claimed configuration that teaches away from Applicant's claimed invention. Based on the clarifications to Applicant's claims, the combined teachings of the cited references clearly do not render the claimed invention *prima facie* obvious. Applicant respectfully requests reconsideration of the rejections based on the following comments.

Under a Graham analysis, the differences between the claimed subject matter and the teachings of the references must be examined. See *KSR International, Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1729 (2007). The Examiner points to the description of metal or metalloid dopants in

Application No. 09/715,935

Thaler at columns 5, 6, 8 and 11. With all due respect, the teaching of a metal or metalloid dopant in Thaler does not support the Examiner's position. Claim 27 does not just state that metal or metalloid elements are present in the reaction. The relevant claims indicate that the metal or metalloid precursors are part of a reactant stream **from a reactant inlet** that reacts to form product particles **downstream** from the light beam and that the flow passes through the light beam. With all due respect, the Examiner seems to be ignoring these other features of the claim contrary to the instructions of *KSR*. See, MPEP 2141 (2)(b), emphasis added, "Ascertaining the differences between the claimed invention and the prior art requires interpreting the claim language, see MPEP § 2111, and considering **both the invention and the prior art as a whole.**"

Referring to column 5, lines 24-38, Thaler is referring to metal that is sputtered **from the substrate**. No flow is generated of the metal **from a reactant inlet** as indicated in claims 18 and 27. Referring to column 6, lines 21-27, the metalloid silicon is originated form the **substrate**, i.e. **sacrificial substrate**, such that no flow is generated of the silicon. With respect to the silicon nitride described on column 8, lines 6-10, this material is generated from a silicon substrate exposed to a nitrogen environment, such that no flow of silicon as claimed is ever generated. In the discussion from column 9, line 54 to column 11, line 28, Thaler discusses the formation of molten metal droplets as an "ablation material" generated from an "ablation source." See column 10, lines 36-39, "In the first stage (FIG. 16), a laser is focused just short of the ablation source material (AS). As a result, a small area 122 of the ablation source 114 is vaporized into the plasma." Thus, the metal is generated from the substrate through the interaction of the substrate with the laser beam. Thaler simply does not teach or suggest a reactant stream **"from a reactant inlet"** comprising a metal or metalloid precursor in which the **"flow passes through the light beam,"** in which the reactant stream reacts **"to produce within**

RECEIVED
CENTRAL FAX CENTER

JUL 08 2008

Application No. 09/715,935

the flow a product stream comprising particles downstream from the light beam" or in which "the light beam does not intersect with the substrate." The secondary references do not make up for any of these multiple deficiencies of Thaler.

In addition, on page 3 of the Office Action, the Examiner evidently agrees that modifying Whitney according to the teachings of Thaler renders the Whitney device inoperable, but the Examiner notes that the "rejection is made over Thaler in view of Whitney." With all due respect, Applicant's argument relating to inoperability was based on the combination without the need to identify a primary reference. For clarification, this analysis is rephrased in terms of Thaler as the primary reference. Thus, consider the modification of the Thaler apparatus based on the teachings of Whitney. Whitney teaches that a substrate intersected by a laser can be moved relative to the laser beam to deposit material onto the substrate heated by the laser beam. Thus, with respect to Thaler, Whitney arguably teaches moving substrates 32 of Figs. 1, 4, 5 and 7, or substrate 92 of Fig. 13. Independent claims 18 and 27 explicitly indicate that the light beam "does not intersect with the substrate." Thus, Whitney clearly teaches away from the claimed invention of claims 18 and 27 since Whitney teaches that the laser intersects the substrate being coated.

The Examiner further points to Allen et al. relating to laser-assisted CVD. However, Allen, as with Whitney, teaches the laser directed at the substrate. According to Allen, the "experimental requirements for pyrolytic LCVD are shown in [Allen's] Fig. 1." Fig. 1 shows the laser striking the substrate. Thus, Allen also teaches away from Applicant's claimed invention. The light reactive deposition approach of Applicant's claimed invention differs in fundamental mechanistic ways from the LCVD approach of Whitney and Allan. "The court relied upon the corollary principle that when the prior art teaches away from combining certain known elements, discovery of a successful means of combining them is more likely to be

Application No. 09/715,935

nonobvious. ... The fact that the elements worked together in an unexpected and fruitful manner supported the conclusion that Adam's design was not obvious to those skilled in the art." *KSR Int'l Co.*, at 1740.

Thus, a comparison of the differences between the cited references and the claimed invention reveal several fundamental and irreconcilable differences. The cited reference alone or combined do not teach or suggest a reactive flow configuration as claimed. The Whitney and Allen references both teach that the moving substrate should be intersected by the laser beam, and thus these references teach away from the claimed invention that explicitly excludes this configuration. Thus, there are very significant changes in the respective functions of elements between the claimed method and the methods of the cited references. The differences between the claimed subject matter and the teachings of the cited references are clearly not a simple matter of combining elements with predictable results since the elements are configured in fundamentally different ways in the claimed methods.

"A court must ask whether the improvement is more than the predictable use of prior-art elements according to their established functions. Following these principles may be difficult if the claimed subject matter involves more than the simple substitution of one known element for another or the mere application of a known technique to a piece of prior art ready for improvement." *KSR Intern. Co.*, 127 S. Ct. at 1731. Under the present facts, none of the references teach or suggest the claimed reaction and coating configuration. Similarly, none of the references point to any problem at all that can be solved by the claimed coating configuration of the pending claims. Actually, Whitney and Allen suggest that the laser beam must strike the deposition substrate. The presently claimed coating method has the capability for forming very high quality coatings at high coating rates with a broad range of chemical compositions as described in published U.S. application 2005/0019504A to Bi et al., entitled

Application No. 09/715,935

"High Rate Deposition of High Quality Optical Coatings." The cited references simply do not point a person of skill in the art toward the claimed invention.

The claimed subject matter has fundamental differences with the teachings of the cited references. The present claims are clearly not rendered *prima facie* obvious by the combined teachings of the cited references. Applicants respectfully request withdrawal of the rejection of claims 18, 20, 22-28, 62, and 64 under 35 U.S.C. § 103(a) as being unpatentable over Thaler in view of Whitney and further in view of Allen. Applicant does not acquiesce in the Examiner's assertions regarding the dependent claims, although Applicant does not generally comment further on these issues since these issues are moot in view of the comments above.

Rejection Over Thaler, Whitney et al., Allen et al. and Rao et al.

The Examiner rejected claims 21, 63 and 65-70 under 35 U.S.C. § 103(a) as being unpatentable over Thaler, Whitney and Allen as applied above and further in view of U.S. Patent 5,874,134 to Rao et al. (Rao). Claim 21 depends from claim 18. Claims 63 and 65-66 depend from claim 27. As described below, Rao fails to make up for the deficiencies of Thaler, Whitney and Allen. Furthermore, Rao teaches away from the claimed method. Applicant respectfully request reconsideration of the rejection based on the following comments.

With respect to the claims depending from claims 18 and 27, the list of deficiencies of Thaler, Whitney and Allen are described in detail above. As with Whitney, Allen and most of the embodiments of Thaler, Whitney teaches directing a laser beam at the substrate. Rao does not teach a light beam that "does not intersect with the substrate," and Rao does not teach "a flow that passes through the light beam, a reactive flow that reacts "to produce within the flow a product stream comprising particles downstream from the light beam." There are multiple deficiencies that are not addressed at all by Rao. Clearly, the combined teachings of Thaler, Whitney, Allen and Rao do not come close to rendering claims 18 or 27 *prima facie* obvious.

Application No. 09/715,935

Independent claim 67 has similar features as claims 18 and 27. As has been discuss in detail above, Rao teaches away form Applicant's claimed reaction configuration. In particular, Rao teaches that the laser beam or plasma torch must be aimed at the substrate such that it functions as a "hypersonic impactor." Thus, Rao does not make up for the deficiencies of Thaler, Whitney and Allen with respect to the orientation of the reactive flow and light beam. Specifically, none of the references alone or combined teach a reactant flow from a reactant inlet comprising metal or metalloid elements flowing through a light beam to form product particles downstream from the light beam that are directed to a substrate.

Claim 67 further specifies that the substrate is moved to form a coating "in a controlled way over a selected portion of the substrate less than the entire substrate surface." The Examiner has not addressed this feature, contrary to the requirements of a Graham analysis. Nothing in the combined teachings of these references points in any way to Applicant's claimed invention.

Thus, the combined teachings of the cited references do not render Applicant's claimed invention *prima facie* obvious. Applicants respectfully request withdrawal of the rejection of claims 21, 38, 63 and 65-70 under 35 U.S.C. § 102(b) as being obvious over Thaler, Whitney and Allen in view of Rao.

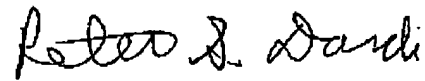
CONCLUSIONS

In view of the foregoing, it is submitted that this application is in condition for allowance. Favorable consideration and prompt allowance of the application are respectfully requested.

The Examiner is invited to telephone the undersigned if the Examiner believes it would be useful to advance prosecution.

Application No. 09/715,935

Respectfully submitted,



Peter S. Dardi, Ph.D.
Registration No. 39,650

Customer No. 62274
Dardi & Associates, PLLC
Suite 2000, U.S. Bank Plaza
220 South 6th Street
Minneapolis, Minnesota 55402
Telephone: (404) 949-5730